ON THE ADVANTAGES OF

SPIRAL COMPRESSION;

EXEMPLIFIED BY THE USE OF ELASTIC

SPIRAL STOCKINGS,

&c.

AS ORIGINALLY INTRODUCED BY

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The Spiral Stocking.

The Elastic Strip.
Foundation of the Stocking.

I AM anxious to address a few words to the Medical Profession of Great Britain, regarding the importance of well-regulated and carefully applied pressure by Elastic Bandages, as I am thoroughly convinced that the use of Spiral Apparatuses will ere long be more generally diffused, and prove of immense benefit in Medical, Surgical, and Obstetric Practice. I must, however, state, *in limine*, that the advantages to be derived from gentle and yielding compression will never be completely obtained, as long as the care of applying it, and of devising the proper shape, material, and the degree of force of the apparatus, is left to persons who have no knowledge of anatomical structure.

I beg to say that I consider it a fact of some importance, that my professional labours are exclusively directed to the furtherance of the objects of compression, and from the attention I have paid to this branch of Surgery, I have discovered methods and contrivances which will now place the application of Elastic Bandages for the relief of various affections, on a scientific basis. As a Surgeon, I was naturally led from my knowledge of anatomy and physiology to study, not only the best modes of applying pressure in cases requiring artificial support, but likewise to inquire into the effects of compression in its different degrees upon circulation, muscular action, nervous power, nutrition, and exhalation.

It was principally from the consideration of these subjects that I gradually perceived the inferiority of the methods hitherto employed, and came to the conclusion that artificial support, either for the limbs or the trunk, should, as nearly as possible, imitate the action of the skin, or the various subjacent fasciæ. It was plain that this object could not be accomplished by the defective materials employed, even to this day, in

the manufacture of bandages, nor with the whalebone and lacing contrivances, which have done so much harm, and so materially retarded the general adoption of elastic apparatuses.

The great fault of the bandages offered for sale in this metropolis is, that they are closely knitted or worked, the proper elasticity of the Indian Rubber being thus almost lost, as the meshes are so closely set and so tight that the stretching in any direction is very imperfect.

The *worked* or knitted India Rubber and cotton threads should be entirely proscribed from surgical practice, for the surface in contact with the integument is uneven and knotty; this circumstance produces very unpleasant effects on the skin, and deters patients from availing themselves of elastic bandages, and consequently many of the advantages which carefully and scientifically applied pressure may hold out, are entirely lost. Another great fault in the knitted stockings is, that the upper part is generally made stronger than the lower, the former thus comes to act as a very uncomfortable garter, and by its pressure causes the veins situated beneath to become varicose. A third objection to the knitted stocking, and a very great one, indeed, is that they are all made with a coarse seam at the back; this seam is perfectly unyielding, presses uncomfortably upon the part along which it runs, and gives the patient considerable pain. I follow, as will be seen below, an entirely different system, for I hold that the pressure should gradually become *weaker* from below upwards, my upper circular band being more feeble than any of the rest. The upward course of the venous blood is then most effectually assisted. As the ordinary worked stockings are hard, unyielding, and coarse, the patient finds it very difficult to use them; and by the efforts he makes to draw them on his leg, he often produces great congestion in a limb already œdematous or affected with varicose veins; and this state of things renders the application of the stocking more hurtful than beneficial.

The next defective apparatus to which I beg to direct attention, is the laced stocking or knee piece. Now it is perfectly clear that, were even the webbing better than it really is, the unfortunate practice of *lacing* must defeat the good effects which pressure might produce; for the patient, by bending down in order to lace his stocking or knee cap, inevitably produces great congestion in the lower extremity. He then regulates the pressure according to the *accidentally* swelled leg, and some time afterwards the stocking is loose, unles it has been laced very uncomfortably at first. Nor is it possible that with a laced stocking the pressure can

be at all equable, because the patient, or the person assisting him, cannot by any means regulate the tightness in such a manner as to make it of the same force throughout the leg. In fact, laced stockings are more likely to do harm than good; and it may indeed be said that they are already put upon the shelf.

I cannot refrain from alluding, for a moment, to the use of knee, calf, and ankle pieces: these contrivances, especially when laced and not made with the utmost care and yielding material, are very apt to produce unpleasant congestion in the parts situated beneath. This disagreeable result is so dangerous in itself, and fraught with so much inconvenience, that I cannot too strongly recommend the utmost caution in the use of knee, calf, and ankle pieces. Either have the whole stocking, or if you *will* confine the pressure to the knee, calf, or ankle, let the bandages be made with the minutest care, and avoid worked or laced apparatuses.

I am happy to say that the elastic spiral stockings, knee, calf, or ankle pieces, by acting circularly, and by having their elasticity graduated in the most scrupulous manner, are not open to any of the objections which may justly be brought against the knitted and laced bandages.—What is in fact wanted, when pressure of a regular, systematic, and gentle kind is applied to a limb? That those parts which have lost a portion of their tonicity should be supported; that vessels in which the circulation is slow and yielding to the influence of gravity, should have their coats strengthened and their valves assisted; that the fasciæ which may have become weak and debilitated be strengthened; and that the absorption of the fluid effused in the subscutaneous cellular tissue be favored.

But all this must be effected without any disturbance to the arterial circulation of the limb, and without the slightest interference with the deep or peripheral nervous distribution. This is certainly no trifling task, but it has happily been accomplished by using peculiar textures, combinations, and forms, so as to give a kind of new skin possessing almost all the advantages of the old.

How has such an admirable improvement been effected? First, by putting aside altogether the usual modes of applying pressure; (I have shown above that the methods followed by most bandage-makers are highly defective;) secondly, by fixing upon an entirely new plan of manufacturing elastic textures; thirdly, by having the latter made into narrow strips or bands nicely graduated and of greater or less elasticity;

fourthly, by getting these attached to each other in a peculiar manner, which in no way interferes with, but rather favours the yielding properties of the India Rubber webbing; and, fifthly, by thus effecting pressure in a strictly spiral direction.

The engraving in the 1st page will show at a glance of what nature and size are the strips to which I am now alluding. The spiral or circular method as applied to elastic stockings, may be defined in the following manner: a number of elastic circles exactly encasing the leg, and exercising a gentle, regular, and continuous pressure from the toes upwards. This pressure may be varied to any extent, from the almost imperceptible and weak compression of a silk stocking, to a pressure very short of pain. There are, of course, between these two extremes numerous gradations, and the amount of pressure should always be regulated according to the nature of the case.

Not only, however, can the stocking be made to effect more or less pressure throughout the leg, but the great advantage of the spiral method is, that we are enabled, by using stronger strips in certain parts of the stocking, (these strips are only one inch in depth) to constrict more on certain spots where the surgeon wishes the compression to be greater, than on others. I would here mention a point of great importance, viz. that the elastic force should at first be extremely gentle, however œdematous the leg may be, for the patient should be gradually accustomed to the pressure. As the treatment proceeds, and the improvement begins, the force may be gradually increased, so as eventually to overcome the œdema, and give support without pain.

It will readily be perceived that the elasticity of the spiral stockings is especially in a circular direction, and that the stretching faculty is much less from above downwards. This circumstance is very favourable to the steadiness of the apparatus, and will prevent the unpleasant necessity of frequently drawing it up; this stocking then becomes very like an artificial skin, which not only relieves, but prevents a great number of those ailments to which the lower extremity is subject.

Some persons, who have never worn elastic appliances, or who have used defective ones, fancy that they will be too hot with the stockings, and that they cannot be worn without inconvenience. This is a mistake, at least as far as my articles are concerned, because the webbing and the coaptation of the strips is so managed that evaporation is by no means checked or prevented; insensible and actual perspiration goes on

as usual, and the stockings, owing to the effect of the heat of the skin, are never damp. By holding the same up to the light, it will at once be seen, that they are very favorable to proper evaporation.

Another great comfort which patients enjoy in using my stockings is, that they can have them frequently *washed* in cold or warm water, the stockings retaining their former properties after the laving process. This is certainly a great advantage in an economical point of view.

No person, then, who has the slightest tendency to œdema of the legs, to a varicose state of the veins, to weakness in the lower extremities, or who begins to walk after consolidated fracture, should omit to wear well-adapted stockings; as with these alone, and not with those sold ready made, worked, or laced, they may completely efface and destroy their complaint. I might here cite hundreds of cases in which the circular-method, as applied to the manufacturing of stockings, has been conducive to the most astonishing cures, both of simple œdema and varicose veins. I could, indeed, bring forward the names of some of our most eminent surgeons, who have kindly allowed references to be made to them, to prove that the circular plan is really the one which has been the most successful, and should therefore have the preference.

The stockings should be put on before rising in the morning, when the legs, by the horizontal position, have either completely lost the œdema, or the veins are almost empty. The latter cannot, therefore, fill again to the same extent as heretofore, and their coats are enabled to act upon the remainder of the circulating fluid. At all events, when the stockings are thus put on, a pressure of so equable and regular a kind is produced, that the effusion in the cellular tissue is speedily absorbed, and the parts so thoroughly supported that the patient at once feels a peculiar lightness about the lower extremities, to which he had long been a stranger.

Nor should it pass unnoticed that with such stockings no irregular protrusion of the soft parts of the leg can take place, as too frequently happens when laced stockings with numerous holes and strings are used. Matters are still worse with the old fashioned knee pieces, for they can effect proper pressure only when the patient is sitting, as soon as he rises the bandage becomes loose, and the object of the apparatus is completely lost.

To remedy this defect, the elastic strips in the kneepieces which I make are so arranged that with the aid of notches carefully measured out in the popliteal space, pressure of a very effective kind is obtained

whatever posture the person may assume. This improvement will at once show that elastic contrivances, in order to be well devised and answer the purpose which surgeons have in view, should be especially entrusted to men who possess some professional knowledge, and whose acquaintance with physiology and pathology will teach them the proper manner of regulating, planning, and carrying out apparatuses, which thus become part and parcel of therapeutics, and take a proper standing among remedial agents.—See *Lancet*, Nov. 20th, 1852. p. 473.

In fact the time is not distant when elastic textures will be more extensively and more commonly used in Surgical practice; and from an experience of many years, I am convinced that the pressure which is now effected by means of rollers, adhesive plaster, sutures, &c., will most effectually be carried out by elastic bandages, and are likely to render great service in many of the cases where it is now hardly suspected that they could be used.

I have, in the observations now addressed to the profession, endeavoured to set in its proper light, the superiority of my method as regards elastic stockings, and as limited to that most useful portion, India Rubber appliances; but it will at once strike every Medical man how multifarious are the applications of the principle I have been advocating.

I hope to be able now and then to devote a little time to record the various, and I may say successful ways in which I am using elastic textures and air pads, in the practice of Surgery. My applications are well known among the profession, and the most flattering approval has generally been given by medical practitioners to the means I employ for effecting steady, equable, and regular pressure in medical, surgical, and obstetric cases.

I have used my best efforts for several years past to modify my elastic appliances according to the wishes of the profession, and the comfort of patients, and I am convinced that the circular or spiral pressure which I have methodically employed, will be more and more valued by medical men. My inventions, in common with all those which possess much originality, and which are extensively approved of by the public, have tempted a host of imitators, but I have no reason to fear these unprincipled thefts, as the profession are fully able to perceive the difference between appliances which emanate from me, and the clumsy imitations which have of late been barefacedly perpetrated.

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(Opposite Mivart's Hotel.)
Jan. 1853.